



Kentucky

Solar Development Analysis

LandGate Corp.

Prepared in Q2 2024

Address

201 Milwaukee Street
Suite 200
Denver, CO 80206

Phone

833-782-5837
Business Solutions
Sales & Support

855-867-3876
Listings & Marketplace
Support

Web

www.landgate.com
energy@landgate.com
Schedule demo:



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Kentucky Solar Development ANALYSIS

The state of solar development in Kentucky can be evaluated by key factors such as federal and local regulations, incentives, grid interconnection and integration. The current state of development activity in Kentucky is growing and can be seen in this analysis summarizing all facets of solar energy project development.

We will break down the various federal and state incentives available to solar energy developers in Kentucky and how to access them.

LandGate provides key data to the top developers and financiers in the country. To learn more about access to this platform, or to talk about how to apply the information below to your business, book time with a member of our dedicated energy markets team.



Kentucky Solar Energy ACTIVITY

Status	MO Solar Farm Count	MO Solar Farm Capacity (MWac)	MO Solar Farm Generation (MWh)
Operating	7	68	11,671
Under Construction	2	57	39,154 (est.)
Planned	5	737	556,725 (est.)
Queued Projects	144	9,798.51	10,418 (est.)
Site Control (Lease Options)	9	740	418,464 (est.)

*est is the estimated peak total electricity generation that those solar farms will produce once operational

As of February 2024, Kentucky has just 7 operational solar farms with a current capacity of 68 MW and a current electricity generation of 11,671 MWh. Kentucky has 2 solar farms under construction with 57 MW capacity total and 5 planned solar farms with 737 MW¹ capacity. Kentucky has a significant amount of Utility-Scale queued solar farms compared to the other states in the US, with 144 queued projects and 9 site control projects.

Overall, if all planned and under construction farms go into operating status, Kentucky will expand its capacity by 794 MW. In Kentucky, the average solar farm size is 113 acres producing 9.7 MW of electricity under ideal conditions. So a solar farm in Kentucky needs an average of 11.6 acres per MW of capacity.

Utility-Scale vs. Community-Scale **SOLAR**

Utility-scale solar refers to solar farms often created and managed by utilities, independent power producers, or energy firms. These projects aim to produce electricity on a large scale and deliver it directly into the distribution grid. These solar farms generally have **more than 10 MW** in capacity. Contrarily, community-scale solar refers to smaller-scale solar power facilities, **under 10 MW**, that are primarily intended to serve local communities or particular user groups. Below is a breakdown of the different types of solar farms and their development statuses.

Utility-Scale

Kentucky is a state for solar development where the state is regulated by PJM and TVA.

PJM

Withdrawn Status
Total Withdrawn: 39 Projects
Project Queued Time: 42.35 Months

TVA

Withdrawn Status
Total Withdrawn: 13 Projects

Projects Queued for Development in Kentucky

ISO	Number of Solar Farms	Capacity (MWac)
PJM	134	8,966.09
TVA	10	1,452

A project in queue means that the project enters the interconnection queue of that region waiting for regulatory approval. During this period, the analysis of possible engineering and land factors is conducted to determine the feasibility of the project to be constructed and connected to the grid. The average amount of time it takes for a farm to go from queue to operational in Kentucky is **42 months**. As per the projected in-service dates for the current projects in queue, Kentucky will most likely add **9 GW** of Utility Scale farms.

Projects Under Site Control

Site Control is land under lease or under option to lease. Solar developers run an initial assessment of the suitability of parcels for solar farms. After they put the land under option, they need time to run their due diligence and submit the project to the queue. When the solar project is about to be approved by the queue, the solar developer exercises the solar farm option agreement to convert it to a solar farm lease agreement. These site control projects have not entered the interconnection queue yet. Currently there are 9 project leases with an estimated capacity of 740 MW.

Did you know?

LandGate's PowerCapital solution is the only technology suite offering a complete M&A database and research analytics for wind, solar, and CCS project development.

LandGate analyzes county tax & deed assessor records to find lease agreements already in place between developers and landowners. This unique dataset is continuously updated by a process that locates new lease documents within days of new agreements being filed with each county.

How do developers screen and run due diligence for those solar farm projects in site control?

Factors to take into consideration:

- Electricity generation
- Electricity commodity prices (LMP, incentives, PPA)
- Capital costs
- Operating costs
- Timing
- Risks

Using the factors above and a standard solar panel size, the buildable acreage and a land coverage ratio (encompassing row spacing and maintenance spacing) we calculate the maximum number of panels that could fit on the parcel. This helps us estimate the capacity the project lease will add to the grid and calculates a Market Value of the solar project.

Solar PowerVal enables similar capabilities to evaluate land

parcels for solar development and get an independent economic report for solar projects of all statuses. This tool allows developers and project financiers to fast-track the process of submitting a feasibility study to the queue for approval through independently produced Engineering & Economic analytics and Solar 8760 reports or evaluate projects and parcels for origination and M&A.

How is a Utility-Scale solar project submitted to the queue to connect to the electric grid?

Typically, the queue submission process within an ISO or Utility area follows similar steps. The solar developer needs to complete and submit an official interconnection request form provided by the ISO or utility, that captures essential project details and starts the interconnection process. Project specifications should include details like name, location (latitude and longitude), point of interconnection, capacity, expected energy production,

environmental impact, technology layout- inverters, solar panels, system layout through a Feasibility study with an 8760 report to help initially assess the project's compatibility with the existing grid infrastructure. The Solar developer will also have to pay an initial payment to secure a position in the interconnection queue and contribute towards the cost of initial studies and evaluations conducted by the ISO/Utility. Post the submission of the form, reports

and payment, the project is now effectively in the queue.

After the project has entered the queue, Injection reliability study and system impact study is conducted. These studies determine the exact impact of the project on existing infrastructure and identifies any potential network updates required to reliably interconnect the solar project to the grid. Once the study is completed, the developer gets a complete picture of the financial cost of the solar farm with regards to the complete CAPEX and Budget. This helps the decision making process of whether to move forward with the development of

the solar project or withdraw the application from the queue. If the project seems viable to move forward the developer signs an interconnection agreement with the ISO/Utility and essentially looks to produce Economic and Financial reports for Bankers and Investors to help facilitate the construction of the solar project.






Commercial, Community & Behind-the-Meter Solar Farms

Kentucky is a state primarily regulated by Duke Energy, LG&E and East Kentucky Power Cooperative for small-scale community solar farms.

Kentucky has seen considerable growth in Community and Distributed generation. The state is currently building out a pipeline for small scale solar project development and there has been much discourse on the implementation of community solar programs.

Kentucky has a tradition of cooperative utilities, which are member-owned and often more responsive to local interests. This structure can facilitate community solar projects as cooperative utilities are more inclined to support community initiatives. These programs typically allow consumers to access solar energy without the need to install their own solar systems, typically benefiting from energy generated at an external solar array.

Key Solar Installations in Kentucky

Project	Utility/Cooperative	Project Details
LG&E Solar Share		<ul style="list-style-type: none"> • Fully operation since May 2020 • 35 acres • 1 MW
Cooperative Solar		<ul style="list-style-type: none"> • 16 owner members • No hassle, maintenance or expense of owning private solar panels • < 1 MW
Amazon Air Hub Rooftop		<ul style="list-style-type: none"> • 5,600 photovoltaic panels • 800,000 square feet • 2 MW
Walton Solar Power Plants 1 & 2		<ul style="list-style-type: none"> • 19,000 photovoltaic panels • 60 acres • 4 MW
Crittenden Solar Power Plant		<ul style="list-style-type: none"> • 12,500 photovoltaic panels • 110 acres • 2.7 MW

Kentucky

LMP Data

LMP (Locational Marginal Price) is a pricing mechanism used in wholesale/merchant energy markets to determine the cost of electricity at specific locations (nodes) within the grid. LMP considers a number of variables, including the cost of generating power, transmission constraints, grid congestion, losses, and load at certain nodes or locations within the electrical grid. The prices at which electricity is bought and sold in the market in real time or on an hourly basis are reflected in its calculation, which is done through market procedures.

Kentucky saw the average LMP price increase by 52.5% in the past 3 years with an average price of 39.02\$/MWh in 2023. This price is expected to increase by 8.5% in 2024 and attract several renewable energy developers for utility and community scale solar projects. Similarly, consumer electricity purchase cost has also increased for the past few years

in Kentucky. The current commercial electricity rate is 10.56 ¢/kWh which is a 7.7% increase compared to the commercial electricity rate of 9.80 ¢/kWh in 2021.

Higher LMP prices correspond to higher electricity costs, which could mean more money for solar installations. When compared to solar projects in areas with lower LMP pricing, locations with higher LMP prices may result in higher revenue. Power purchase agreements (PPAs) and solar project participation in energy markets are both impacted by LMP. The ability to engage in market transactions and maybe land more advantageous PPAs gives solar projects situated in areas with favorable LMP pricing a competitive edge in the electricity markets. LMP can affect the PPAs for solar projects' pricing conditions, lengths, and general allure.

By offering participants in community solar more potential power bill savings, higher LMP pricing can improve the value proposition. Greater adoption of community solar may result from community solar projects situated in regions with higher LMP prices being more economically feasible and appealing to potential members.

Kentucky

LMP Scorecard



Merchant Energy Pricing: Market: MISO & SPP Hub: Kentucky.Hub	
Number of price nodes active:	130
Average LMP price as of 02/22/24:	\$39.02
Average retail price as of 02/22/24 (how much a community solar farm or behind the meter electricity generation sales electricity for + consumer purchase cost)	10.56¢/kWh Current commercial electricity rate 9.80¢/kWh Rate in January 2021
Percentage change in average LMP in the past 3 years	+52.5%
Forecasted percentage change in average LMP Price for 2024:	+24.8%

Average LMP Prices: Historical & Forecasts

Year	Avg LMP Price (\$/MWh)
2018	\$41.98
2019	\$26.39
2020	\$21.57
2021	\$39.29
2022	\$71.28
2023	\$33.60
2024 (est.)	\$32.94
2025 (est.)	\$36.38
2026 (est.)	\$41.59

Based on the LMP and ISOs data in Kentucky, the 2024 average LMP is estimated to be \$32.94/MWh, decreasing by 9% compared to 2023.

Missouri

PPA Data

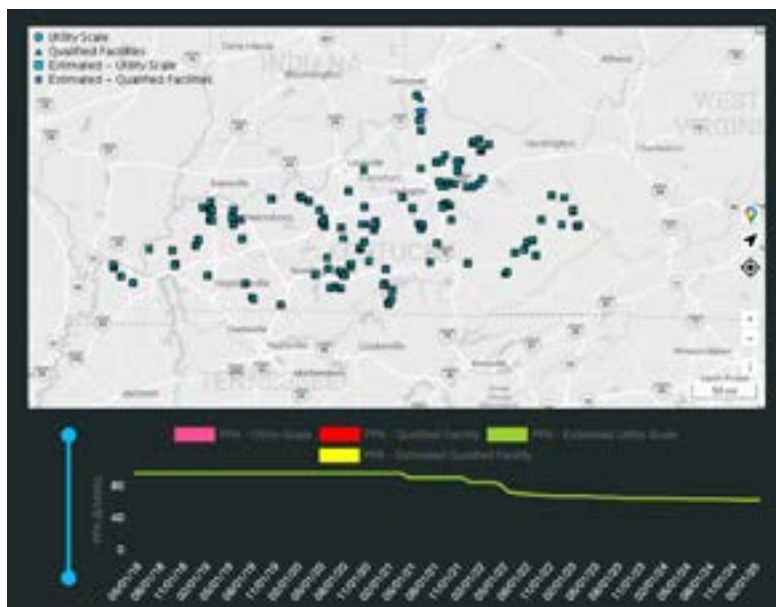
Utility-scale solar can be integrated into the grid and electricity can be sold at a predetermined price thanks to PPAs (Power Purchase Agreements) with utilities or power purchasers. Even if they are unable to put solar panels on their own homes, PPAs for community-scale solar projects allow local participants to profit from solar energy generation. The time and amount of power sales are governed by the PPA's terms, which guarantees a steady market for the solar installation.

The average estimated Utility-Scale PPA price in Kentucky is \$64.65/MWh. This price has decreased 33% over the past 3 years. In Kentucky, a lower PPA price means that the cost of power from the particular project is now more competitive when compared to other energy sources. It implies that a solar or wind farm, for example, has become more cost-effective and is now able to offer electricity at a cheaper cost,

making it a more alluring option for consumers. Electricity consumers may benefit from cheaper electricity prices as a result of a drop in PPA prices. This can lower consumers' overall energy expenses and have a positive effect on their electricity bills, whether they are residential, commercial, or industrial customers.

Kentucky

PPA Scorecard



Average PPA price 2023:	\$64.65/MWh
Average PPA price change in the last 3 years	+33%
Largest PPA buyers:	Amazon

Federal & Kentucky State Tax Incentives for Solar Developers

There are several federal and state incentives available for solar development in Kentucky, intended to encourage the use of solar energy by making solar power more affordable for businesses and organizations that install solar systems. These incentives can improve the financial viability of solar projects since they lower the initial costs and increase the return on investment. Solar project incentives aid in the switch to clean, renewable energy sources, which lower greenhouse gas emissions and slow climate change. Incentives aid in increasing the deployment of solar projects by making solar energy more financially appealing, replacing fossil fuel-based power and lowering the environmental effects related to traditional energy sources.

Solar Development Incentive	Type	About
Commercial Incentives	State	Kentucky also offers specific incentives for businesses and nonprofits, such as below-market-rate loans through the City of Louisville Go Green Loan Program and the USDA REAP Grant for agricultural producers and rural small businesses to purchase and install renewable energy systems.
Net Metering	State	Kentucky mandates utility and electric cooperatives to offer net metering for systems up to 30 kW. This allows solar panel owners to earn credits for excess electricity produced, which can offset the cost of power drawn from the grid, though compensation is at the avoided-cost rate, which is lower than the retail rate.
Kentucky PACE Financing Program	State	For commercial customers, PACE financing provides a method to finance solar installations with minimal initial costs, repaid through a voluntary property tax assessment. This program is particularly beneficial for those unable to secure traditional financing methods.
Federal Solar Tax Credit (ITC)	Federal	Developers can claim 30% of the installation cost as a credit on their federal income taxes.



With such a wealth of new data on the state of Solar Development in Kentucky, we imagine you might have questions about how to apply these trends, data, and tools to your own solar development efforts in Kentucky. Our dedicated energy markets team can help walk you through how to access and interpret this information in a way that is relevant to your business needs. Schedule time with our team here to talk one on one.



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